

**WHAT IS CLAIMED IS:**

1. A wireless communication receiving apparatus, comprising:

an antenna for receiving via first and second wireless communication channels a composite communication symbol that represents first and second communication symbols which each correspond to a result of a coding operation performed by a transmitter apparatus on a bit stream;

a probability generator coupled to said antenna and responsive to said composite communication symbol for generating, for said first and second communication symbols, corresponding first and second pluralities of probabilities that the communication symbol has respective ones of a plurality of possible values of the communication symbol;

a combiner coupled to said probability generator for combining said first and second pluralities of probabilities to produce a plurality of combined probabilities;

a SISO decoder corresponding to said coding operation and coupled to said combiner for receiving the plurality of combined probabilities and producing therefrom a further plurality of combined probabilities;

a splitter coupled between said SISO decoder and said probability generator for receiving said further plurality of combined probabilities and producing therefrom third and fourth pluralities of probabilities that respectively correspond to said first and second communication symbols; and

said probability generator operable for generating said first and second pluralities of probabilities also in response to said fourth and third pluralities of probabilities, respectively.

5           2.     The apparatus of Claim 1, wherein said combiner is a multiplier.

3.     The apparatus of Claim 1, wherein said splitter is a marginal probability calculator.

10          4.     The apparatus of Claim 3, wherein said combiner is a multiplier.

5.     The apparatus of Claim 1, wherein said plurality of combined probabilities is received at an a priori output probability terminal of said SISO decoder.

15          6.     The apparatus of Claim 5, wherein said further plurality of combined probabilities is a plurality of combined a posteriori output probabilities produced by said SISO decoder.

20          7.     The apparatus of Claim 1, wherein said further plurality of combined probabilities is a plurality of combined a posteriori output probabilities produced by said SISO decoder.

8. The apparatus of Claim 1, including an interleaver connected between said probability generator and said combiner and a de-interleaver connected between said splitter and said probability generator.

5 9. A method of wireless communication, comprising:  
receiving via first and second wireless communication channels a composite communication symbol that represents first and second communication symbols which each correspond to a result of a coding operation performed by a transmitter apparatus on a bit stream;

10 for said first and second communication symbols, and responsive to the composite communication symbol, generating corresponding first and second pluralities of probabilities that the communication symbol has respective ones of a plurality of possible values of the communication symbol;

15 combining the first and second pluralities of probabilities to produce a plurality of combined probabilities;

applying the plurality of combined probabilities to a SISO decoder that corresponds to said coding operation;

the SISO decoder producing from the plurality of combined probabilities a further plurality of combined probabilities;

20 splitting the further plurality of combined probabilities into third and fourth pluralities of probabilities that respectively correspond to the first and second communication symbols; and

said generating step including generating the first and second pluralities of probabilities also in response to said fourth and third pluralities of probabilities, respectively.

5           10.    The method of Claim 9, wherein said combining step includes multiplying said first and second pluralities of probabilities.

          11.    The method of Claim 9, wherein said splitting step includes calculating marginal probabilities.

10           12.    The method of Claim 11, wherein said combining step includes multiplying said first and second pluralities of probabilities.

          13.    The method of Claim 9, including applying said plurality of combined  
15 probabilities to an a priori output probability terminal of the SISO decoder.

          14.    The method of Claim 13, wherein said further plurality of combined probabilities is a plurality of combined a posteriori output probabilities.

20           15.    The method of Claim 9, wherein said further plurality of combined probabilities is a plurality of combined a posteriori output probabilities.

16. The method of Claim 9, wherein said combining step includes de-interleaving one of said first and second pluralities of probabilities.

5 17. The method of Claim 9, wherein said splitting step includes interleaving one of said third and fourth pluralities of probabilities.

18. A wireless communication transmitter apparatus, comprising:  
an input for receiving a bit stream;  
10 a coder coupled to said input for performing a coding operation on said bit stream, said coder having an output for providing a result of said coding operation;  
a first modulator coupled to said coder output for modulating said result, and a first antenna coupled to said first modulator for transmitting said modulated result on a wireless communication channel;  
15 an interleaver coupled to said coder output for producing an interleaved version of said result; and  
a second modulator coupled to said interleaver for modulating said interleaved version, and a second antenna coupled to said second modulator for transmitting said modulated interleaved version on a wireless communication channel.

20 19. The apparatus of Claim 18, wherein said coder is a convolutional coder.

20. The apparatus of Claim 18, wherein one of said first and second modulators is a QPSK modulator.